

## Success Story

**Management at Phoenix Transit (in Arizona) found that attrition among its part-time drivers was exceptionally high. These employees received lower wages than their full-time counterparts and were not eligible for benefits. Management decided to discontinue the part-time positions and went to a full-time workforce. To accommodate peak periods without creating additional split shift jobs, Phoenix Transit implemented an innovative program whereby retired drivers are hired back for 20 to 25 hours per week to work not more than one peak period a day. The agency pays these experienced drivers at the maximum hourly rate, but because they are retirees, there is no need to pay benefits. Phoenix Transit feels this arrangement has been extremely successful. They have experienced drivers who may be less likely to be fatigued doing the peak runs. Management feels there has been a positive effect on safety, although no formal study has been conducted.**

Filling part-time operator positions with individuals who limit their work hours by choice not only solves the retention problems discussed in the TCRP report but also all but reduces the risk that this group of operators will be subject to reduced alertness on the job. Individuals who choose to work less than a full-time 40-hour workweek usually do so because of other commitments such as family or education obligations. Because this group has self-selected a limited work schedule, they may also recognize that the limited hours will allow time for personal time, including adequate rest.

## Assigning Personnel to Cover Temporary Vacancies

Each day the operations managers of the transit enterprise find themselves with some vacancies, extra work, delays and other operational circumstances that disrupt the smooth rotation of duties described in the run book. Some employees decide to work in the pool of employees set aside for this extra work (referred to as the extraboard, spareboard or cover list). The schedules of these employees can be especially fatiguing. When the spareboard, extraboard or cover list is exhausted managers attempt to cover the open work with overtime by extending some employees' shifts or calling others to work on their rest days. These arrangements may also be fatiguing.

This section includes techniques, strategies and considerations to help the transit agency and its employees design and implement procedures for the coverage of open work in a manner that does not create circumstances known to promote debilitating levels of operator fatigue. These elements include:

- Suggested guidelines for filling vacancies in a way that avoids arrangements known to fatigue operators.
- Recommendations regarding the establishment and management of "call windows" for extraboard employees to provide opportunities for adoption of a regular schedule of rest and recovery.
- Strategies regarding staffing for special events (e.g., shuttles to the state fairgrounds) or for emergencies (e.g., a blizzard) that temporarily add to the workload of some of operators at a transit enterprise.

## Minimizing Operator Fatigue

This tool consists of a set of guidelines that the crew caller or supervisor should consider when assigning personnel to cover temporary vacancies. These principles are a subset of the work schedule guidelines that apply when generating work schedules for bid.



### Guidelines for Filling Temporary Vacancies

Illness and personal responsibilities can create temporary vacancies on your daily roster. When this occurs the vacancy must be filled on short notice so that service is not disrupted. In selecting an operator to cover the open work you should attempt to assign an employee who is not likely to become fatigued with the added work.

The European Foundation for the Improvement of Living and Working Conditions publishes the BEST (Bulletin on European Studies on Time) guidelines on work scheduling. The following scheduling practices, based on the BEST guidelines, will help to minimize the risk of fatiguing the operator:

- *Avoid short intervals of time off between shifts* – People need to perform a variety of activities between working periods. If this time is truncated then it is likely that the operators will shorten their sleep period to accomplish their other activities, and thereby potentially fall into a sleep debt.
- *Avoid extended work sequences* – Workers should have at least one day off per week. People need time off to take care of their personal and social obligations. Most people, when given the choice, would probably choose to earn extra money, but this makes it more difficult for them to take care of their other activities and ultimately ends up with shortened sleep time and an increased risk of at-work sleepiness. Avoid filling the vacancy with an operator who has not had a day off in a week.
- *Fix shift length to task load* – The length of duty should be dependent upon mental/physical demands so operators should be scheduled fewer hours on demanding runs. People have limited alertness reserves to tap before they start becoming tired and fatigued, which leads to a drop in vigilance. Try to avoid assigning overtime to an operator

who has already worked during rush hour, special events or any other difficult runs.

- *Rotate shifts in a forward direction* – Backward rotation – starting work today at an earlier time than yesterday – is fatiguing. Avoid this pattern when selecting an operator to fill the vacancy.



### Managing the Extraboard

Recognizing that not all mechanisms for covering vacant work with available personnel yield similar impacts on fatigue, alertness and finance, some transit enterprises have explored a variety of creative ways to manage the extraboard. Among the most practical and useful is the application of “call windows” for extraboard staff, providing staff with the ability to predict when they are most likely to be called for relief work. This enables the extraboard staff to sequence their personal lives so that they are rested and ready when they are called for duty. This section describes how the call window concept works in general, and then provides details on how specific properties interleave the call window concept with other strategies and policies they employ to minimize the fatiguing aspects of temporary worker assignments that cover vacancies in the crew roster.

At all transit operations, many, if not most, vacancies are known the day prior to service. Most agencies divide the extraboard into two or three “shifts,” where the employee is on call for a work assignment that begins during their shift. The least elegant approach has all the morning shift extraboard employees report to work at the start of the service day, usually around 4:30 a.m. Each extraboard employee remains in the operator waiting area or lounge until notified of an available run. Under this regime, the “worst-case” scenario is one where an employee reports for work at 4:30 a.m. and is assigned to cover a 12-hour run beginning at 11:59 a.m. Upon the completion of this long day the employee would report to work again the next morning promptly at 4:30 a.m. Such an approach to extraboard management is not only fatiguing, it is also a very inefficient use of the transit enterprise’s limited labor and financial resources. In the example, the employee would be paid for 19.5 on-duty hours work from 4:30 a.m. until the end of the tour of work. Some transit agencies have developed approaches to managing the extraboard that lead to more economic and less fatiguing solutions to the problem of covering vacant runs.

Most North American transit enterprises recognize the importance of labor seniority in the assignment of work. A workable process in North America generally entails some element of choice in selecting work duties with more senior employees granted the privilege of picking their work before more junior employees with less time at the job. The following sections describe the unique elements concerning how two properties manage to avoid operator fatigue and maximize alertness among their extraboard staff while recognizing seniority. The practices at these two agencies illustrate how creative approaches can minimize the risk of fatiguing the extraboard operators.

### ***Property A***

One eastern transit bus property maintains three distinct extraboard rosters – early, matinee and late. Drivers on the early board bid their work by phone the previous day. Operators on the matinee board for work starting after 10:40 a.m. call between 9 and 10 a.m. on the same day. Those on the late board for work starting after 2:10 p.m. call between 10 a.m. and noon. If there are more extraboard drivers than jobs, some “protect” (standby) jobs are made available. Early run start times range from pullout at 4:10 a.m. through 10:39 a.m. Matinee run start times range from 10:40 a.m. through 2:09 p.m. Late run start times range from 2:10 p.m. through evening. If an operator does not call during his/her call-in time, the dispatcher will assign work to such operator prior to the next bidder’s call-in time.

Each day’s bids are reviewed by the dispatcher for “work distribution.” To satisfy work distribution criteria there must be a mandatory minimum rest time for the operator between work periods. The mandatory minimum rest time depends on how many hours the employee works in a 24-hour period. For 12 hours continuous work (less than a 3-hour break) the employee must be off 8 hours. Work up to 16 hours must include a 4-hour break away from property then a 10-hour rest. If an extraboard employee has insufficient rest for the next rotation, the employee is not eligible for the next day’s regular work, but is eligible for a later rotation. For example, on the next day, an early operator could be eligible for any work that the matinee board had not picked. All extraboard operators are guaranteed a day’s work (and pay) even though they may be working a “protect” or stand-by assignment.

The extra work management policies and procedures at this agency incorporate several of the BEST principles discussed above. In

particular this agency's policies keep schedules regular and predictable, avoid fast double-backs, rotate shifts in a forward direction, limit short-term shift changes, allow some individual flexibility, and give plenty of notice when changing shift schedules.

***Property B***

At one large rapid transit property, there had been several serious accidents where fatigue may have been a contributing factor. As a consequence, management and labor established and enforce several work and service policies aimed at reducing operator fatigue and promoting alertness on the job:

1. No operator may work a spread greater than 16 hours without 8 hours rest.
2. All rapid transit work is scheduled with straight runs. (No swings or spread.)
3. By contract, all posted operator runs must range between 8 hours and 9 hours, 59 minutes in duration.
4. A minimum of 8 hours off is required from the end of one assignment to the start of the next. (This does *not* guarantee 8 hours rest since commuting is included in the 8 hours off.)
5. No operator is allowed to work more than 6 days without a day off.
6. No employee is allowed to hold a second job outside the transit agency.
7. Workers can work "doubles" on overtime to cover vacancies that cannot be covered from the extraboard, but in creating "doubles" the agency is trying to cut back to 14 or even 12 hours.

At this agency, the extraboard list is divided into three tours. An employee selects a tour of duty (early, midday, or midnight) and is assigned work that starts within that time window. The crew assignment office assigns the operator to a report location and time, trying to place the operator at a location where they know or anticipate a vacancy will occur. Unlike the eastern bus property in Example A, at this agency the crew assignment office makes *specific* extraboard assignments. The employee does not pick them.

The extraboard operator can pick up additional work, to a maximum of 9 hours 59 minutes, until the eighth hour of his first assignment. If he does, the crew assignment office needs to communicate with the field supervisor who assigns the work so that this operator can be relieved before 16 hours have elapsed. The supervisor also needs to provide feedback to the crew dispatcher at the end of each tour to ensure that long working employees get the 8 hours mandatory minimum rest.

The property introduced a procedure whereby any overtime over 1 hour is communicated back to the crew dispatcher so that the extraboard employee is not assigned to his next job without the required 8 hours of rest. The introduction of this feedback to the crew office represented a major change in process. The property also introduced customized software to allow tracking and enforcement of the minimum 8-hour rest rule.

The extra work management policies and procedures at this rapid transit agency incorporate several of the BEST principles discussed under *Procedures for Developing Fatigue-Resistant Schedules*. In particular this agency's policies, avoid fast double-backs, rotate shifts in a forward direction, avoid extended work sequences – 8 or more continuous work days, keep schedules regular and predictable, limit short-term shift changes, give plenty of notice when changing shift schedules, and avoid excessive reliance on overtime.

In developing its policy and program to manage fatigue and maximize alertness in the workplace, each transit enterprise should assess how its extraboard management procedures conform with the BEST principles and the practices of its peers.

### **Special Events**

From time to time, circumstances in the community served by a transit enterprise greatly increase the demand for transit labor. Such circumstances are usually short term and may include civic festivals such as the state fair, a major sporting event, or the closing of a bridge for maintenance or repairs. In some cases the excessive demand for labor is created by circumstances such as blizzards, hurricanes, or flu epidemics. In some emergencies the workers on hand are asked to work long hours and double shifts because their relief cannot get to work. All these special events create the opportunity for excessive operator fatigue. The transit enterprise should explicitly recognize the increased potential for fatigue that

is created and take appropriate proactive measures in keeping with BEST principles.

Particular policies and considerations that may be useful for agencies facing the short-term need for operators to work longer hours than usual include:

- Minimize sequences of nights – no more than 2 to 4 nights in succession.
- Encourage napping by operators who are subject to long hours on duty.
- Plan schedules with some free weekends.
- Avoid extended work sequences – 8 or more continuous work days.
- Keep the longer schedules fairly regular and predictable.
- Consider night shifts that are shorter than day or evening shifts.
- Rotate shifts in a forward direction.
- Avoid fast double-backs.
- Make shift change times flexible, if possible.
- Allow some individual flexibility in how each worker covers her/his long tour of duty.

Transit agencies have found a number of strategies to be effective in responding to special events and extraordinary circumstances that create the need for extra operator hours. These strategies include the following:

- *Right to refuse work* - At one property, operators have the nominal right to refuse overtime assignments if they have more than 5 years of seniority, but the culture of the organization does not allow them to refuse the work if the agency (and operator) cannot find relief. Moreover, it is reported that no operators refuse extra work if there is a “real” emergency. At other properties, operators do not have



the nominal right to refuse overtime, but supervisors are urged to use discretion in disciplining employees who indicate that they would prefer time off over extra work and pay. Some properties have the contractual right to call operators in to work overtime on their rest days, but most avoid doing so, allowing their employees to rest.

- *Guaranteed Rest* - At most agencies, operators are not allowed to operate for more than 16 hours straight without 8 hours of rest.
- *Special Consideration to Split Shift Operators* - One agency has “special runs” of less than 7 hours of platform time over a 14-hour spread. Operators with these long days are guaranteed 8 hours of pay and avoid weekend work. During emergencies these operators must make themselves available during splits for extra work. This gives the agency additional operators to handle short-term emergencies such as the early release of commuters on the afternoon of a snowstorm.
- *Advance Planning* - When a special event is on the planning horizon, one agency advertises the need for extra workers about 30 days in advance. Operators bid on these future openings the same as they would bid for overtime. Operators with more seniority get first choice of the extra work. When making awards, the crew dispatcher determines whether each bidding operator would have sufficient time off duty at the time of the assignment to handle the added work without violating hours of service guidelines.

### Designing Facilities and Equipment

Opportunities to help mitigate, manage or avoid operator fatigue present themselves when transit agencies are designing facilities and/or purchasing new rolling stock. In the design of reporting locations and bus garages, facilities can be provided to help operators begin their runs rested and ready for work. Regarding rolling stock, vehicle operating compartments are much more comfortable and transit vehicles are much easier to operate safely than they were 50 years ago because of improvements in technology. Agencies should always seek vehicle innovations that make the task of driving a bus, or running a train, safer and less fatiguing.